CLASS: BE   SEMESTER: V
BRANCH: ECE   SESSION : MO/2018

SUBJECT : EE4207 DIGITAL SIGNAL PROCESSING

TIME: 1.5 HOURS   FULL MARKS: 25

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

Q1 (a) Find the fundamental period of the signal. $x(n) = e^{j\frac{\pi}{16}n}\cos n\frac{\pi}{17}$ [2]
    (b) Define Sampling theorem? Describe Aliasing effect with proper example.   [3]

Q2 (a) Define the linearity and causality of a discrete time system. Check whether the system   [2]
        $y(n) = \sum_{k=-\infty}^{n} x(k)$ is time variant or not.
    (b) The unit sample response of a LTI system is   [3]
        $h(n) = 3\delta(n-3) + 0.5\delta(n-4) + 0.2\delta(n-5) + 0.7\delta(n-6) - 0.8\delta(n-7)$
        Find the response of this system to the input x(n) = u(n-1).

Q3 (a) Compare Z-transform with Fourier transform.   [2]
    (b) Let h(n) be the unit sample response of an LTI system. Find its frequency response   [3]
        when $h(n) = \left(\frac{1}{3}\right)^{n+2} u(n-2)$?

Q4 (a) Find the periodic convolution of the sequence $x_1(n) = \{1,2,2,1\}$ and $x_2(n) = \{2,1,1,2\}$ [2]
    (b) Compute the 4-point DFT of the sequence $x(n) = sin\left(\frac{n\pi}{2}\right)$ using Decimation in Time FFT   [3]
        method.

Q5 (a) Define stability of a system in Z-domain?   [2]
    (b) Using partial fraction expansion, find the inverse Z-transform of the signal   [3]
        $X(z) = \frac{1+3z^{-1}}{1+3z^{-1}+2z^{-2}}$ ROC: $|z| > 1$

Q6 (a) Compare DFT with DTFT.   [2]
    (b) Obtain the direct form-II structure of the discrete time system defined as   [3]
        $y(n) = -0.1y(n-1) + 0.72y(n-2) + 0.7x(n) - 0.25x(n-2)$